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An Assessment of the Greenland Halibut Stock Component in NAFO Subareas 0+1

by

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1. Description of the fishery and nominal catches.

In the period 1980-1989 catches of Greenland halibut in Subareas 0+1 have been rather stable with an annual average of 9,000 tons (Table 1-2). Since 1990 catches increased considerably to about 20,000 tons in 1990 and xx,xxx tons in 1991 due to a new trawl fishery in Division 0B. Catches in Subarea 0 increased from 727 tons in 1989 to xx,xxx tons in 1991, mainly due to a new trawl fishery by Canada (Newfoundland) and SNG, and a trawl- and longline fishery by Faroes (mainly trawl catches) in Division 0B. Most of the fisheries took place during September-December in 1991. Catches by Faroes in Subarea 0 mainly by longliners averages 350 tons in the period 1980-1987 increasing to x,xxx tons in 1991.

Catches in Subarea 1 increased from 9,344 tons in 1990 to 10,888 tons in 1991, mainly due to an increased fishery in Division 1A by Greenland. 92% of the catches in Subarea 1 was taken in the fjords of Division 1A by Greenland. Three areas comprise the fishery: Ilulissat, Uummannaq and Upernavik of which Ilulissat makes up more than 50% of the catches. Traditionally, the Greenland fishery was a small-scale longline fishery carried out either by boats below 20 GRT or by means of dog sledges, typically in the inner parts of the fjords at depths of 500-800 meters. Most catches derives from the summer fishery. Since the middle of the 80'ies gillnets were used more commonly in the inshore Greenlandic fishery and in the period 1986-89 gillnets and longlines accounted equally for the catches in Div. 1A. However, since then longline fishery has dominated again and comprised about 83% of the catches in the inshore part of Subarea 1 in 1991. The inshore fishery in Subarea 1 peaks in March and again in July-September.

Of the total catch Japanese offshore trawl catches amounted to about 600 tons in 1991 (taken in Div.1CD in August-November), which is a minor decrease compared to 1990 (861 tons). Minor catches (162 tons) derives from an offshore trawl fishery by Greenland, Germany and Faroe Islands.

2. Input data

2.1 Research trawl surveys

Bottom-trawl surveys have been conducted jointly by Japan and Greenland in Subarea 1 since 1987. In 1991 surveys were conducted in August/September and November (SCR Doc. 92/__, this meeting). The first survey was subdivided and covered Div. 1ABCD at depth of 400-1500m and Div. 1AB at depth of 1-1000m, respectively. The second survey covered Div. 1AB at depths of 1-1000 m. Estimated swept area biomasses were 79,750 tons for Div. 1ABCD, and 2,910 tons and 11,030 tons for Div. 1AB for the first survey and second survey, respectively. The biomass estimate for Div. 1ABCD in 1991 is the highest record in the period surveyed. However, since 1987 the surveys had differed somewhat in area and depth coverage, i.e. the surveys were carried out at different times of the year and have showed differences in distribution of the biomass, which might be due to within-year migrations.

A bottom-trawl survey was carried out jointly by the Russian Federation and Germany in Division 0B in October/November 1991, covering the depth range 200 - 1,500 m. The swept area biomass estimate for Div. 0B was 45,600 tons, which is a markedly decrease compared to the former years (79,000 tons in 1989 and 72,400 tons in 1990, see Table 3).

Abundance indices of Greenland halibut were estimated on the basis of by-catches in shrimp surveys carried out off West Greenland between 62°N and 72°N, from the 3-mile limit to the 600 m depth contour line in July-August 1988-91 (SCR Doc. 92/__, this meeting). Length distributions of by-catches of Greenland halibut showed peaks at 11 and 18 cm, supposedly representing the age-groups 1 and 2. The abundance indices drops from a level of 140 mill. in 1988 to 36 mill. in 1990 and increase to 70 mill. in 1991. The overall decrease in the period appeared in all the surveyed areas. However, from the relative lengths distributions (SCR Doc. 92/__), it is hard to judge whether the decrease in abundance indices is caused by weak recruitment of one or more year-classes. As an extension to this shrimp

survey, an inshore area in West Greenland, Disko Bay, was surveyed between 68°42'N and 70°38'N at the depths range 150-550 m in September 1991. Length distributions of Greenland halibut from this survey confirm that parts of Disko Bay are important nursery grounds for this species. The biomass of supposedly age groups 1,2 and 3 was estimated to 2,100 tons for the surveyed area.

2.3 Research longline fishery.

A trial longline fishery was conducted in Division 1CD in August 1991 by the faroese vessel *VARSOL*. High CPUE values were obtained in the whole surveyed area below depths of 900 m, averaging approximately 250 gram per hook. Length distributions of the catches ranges between 40 cm and 120 cm, with peaks at 60 cm and 85 cm, representing two unimodal distributions for males and females, respectively.

Information on a trial longline fishery for Greenland halibut in February 1991 in Kullorsuaq northerly in Div. 1A (74°N, see Fig.1), shows that catches of Greenland halibut are in the length range 55-100 cm, with a mode at about 70 cm. Based of about xxxx hooks, mean catch of Greenland halibut was estimated to xx gr per hook.

2.4 Commercial fishery data.

Sparse samples from the commercial fishery in 1991 impede catch in numbers calculations from the inshore fishery. No samples were taken from the offshore fishery.

2.5 Other information on the fisheries.

A comparison of two research fisheries with trawl and longline in Div.1D in August 1991, revealed new information on selectivity in trawl and longline fishery for Greenland halibut (SCR Doc.92/__, this meeting). CPUE was compared between the bottom trawl survey conducted jointly by Japan and Greenland with *Shinkai Maru*, and the faroese longline survey with *Varsol* (see Sec. 2.1 and 2.3). Trawl was most efficient for the smaller length groups (approx. 50x for the lengths 42-47 cm), while longline was most efficient for the larger length groups (approx. 30x for the lengths 96-101 cm.

3. Prognoses.

A joint request by Canada and Denmark (Greenland) 'that renewed considerations should be given to the biological and practical implications of combining Subareas 0, 1, 2 and Divisions 3KL for stock assessment purposes', may refer to information already given by Boje and Jørgensen (1990). They conclude that apart from West Greenland fjords (parts of Divs. 1ABCDEF) and Gulf of St. Lawrence (Divs. 4RST), there is no reason to maintain separate assessments for the NAFO Convention Area. Hence, the TAC should be divided in accordance with this subdivision, which involve an overall assessment for all the offshore areas in Subareas 0, 1, 2 and Divs. 3KL. However, at present practical implications impede such a combined assessment, as, at least for Greenland waters, the main part of the fishery takes place in areas not covered by the surveys.

Considerations on changes in the distribution of the fishery within the offshore area, keeping the effort on the same level, does not give rise to any worries on overexploitation of the stock, since the biomass of Greenland halibut seem to be rather uniform distributed in the area, a large part distributed at depths not accessible for the fishery.

For the offshore areas of Subarea 0+1, biomass estimates from the SNG/DEU and Japanese surveys seem consistent during the last 3 or 4 years. In 1991 the biomass estimates may indicate an overall movement of the biomass to Subarea 1, keeping the total biomass constant. However, attention most be paid to the marked increase in catches in Subarea 0 from 1989 to 1990.

For the fjord areas in Subarea 1, catches increased somewhat from 1990 to 1991 probably due to an increase in effort. There is no indices that the stock is affected by this increase.

4. References

Boje, J. and O.A. Jørgensen (1990). On the relevance of a combined assessment of Greenland halibut in NAFO Subareas 0, 1, 2 and 3KL. NAFO SCR Doc. 90/35, Ser.No. N1753.(mimeo).

Table 1. Greenland halibut landings (metric tons) by year and country for Subarea 0 from 1980 to 1989.

	YEAR										
Country	81	82	83	84	85	86	87	88	89	90	91[a]
Can-M	-	-	-	-	-	-	-	-	-	-	1551
Can-N	-	-	-	-	-	-	-	2	-	6194	4380
Can-Q	-	-	-	-	-	-	-	-	-	-	-
E/DEU	-	-	-	-	335	-	-	-	-	-	-
E/FRA-M	-	-	-	-	-	-	-	-	-	-	-
E/FRA-Sp	-	-	-	-	-	-	-	-	-	-	-
E/GBR	-	-	-	-	-	-	-	-	-	-	-
E/GRL	-	-	-	-	-	-	-	-	-	-	-
FRO	170	337	765	370	525	240	388	963	698	2540	-
JPN	-	-	-	-	-	-	-	-	-	-	-
NOR	-	-	-	-	-	-	-	-	-	-	-
POL	-	-	-	-	-	-	-	-	-	-	-
PRT	-	-	-	-	-	-	-	-	-	-	-
SNG	3626	3468	3772	109	179	32	-	59	29	1540	-
USA	-	-	-	-	-	-	-	-	-	-	-
Total	3796	3805	4537	479	1039	272	388	1024	727	10274	5931

[a] Provisional data

Table 2. Greenland halibut landings (metric tons) by year and country for Subarea 1 from 1980 to 1989.

	YEAR										
Country	81	82	83	84	85	86	87	88	89	90	91[a]
Can-M	-	-	-	-	-	-	-	-	-	-	-
Can-N	-	-	-	-	-	-	-	-	-	-	-
Can-Q	-	-	-	-	-	-	-	-	-	-	-
E/DEU	33	9	14	15	-	-	-	-	-	-	3
E/FRA-M	-	-	-	-	-	-	-	-	-	-	-
E/FRA-Sp	-	-	-	-	-	-	-	-	-	-	-
E/GBR	-	-	-	-	-	-	-	-	-	-	-
E/GRL	5755	5397	4136	6509	9127	8705	8668	7003	7492	8352	10241
FRO	-	-	-	-	-	-	-	-	-	131	73
JPN	-	-	-	26	5	-	906	1581	1300	861	571
NOR	-	-	-	2	-	-	-	-	-	-	-
POL	-	-	-	-	-	-	-	-	-	-	-
PRT	-	-	-	-	-	-	-	-	-	-	-
SNG	-	-	-	-	-	-	-	-	-	-	-
USA	-	-	-	-	-	-	-	-	-	-	-
Total	5765	5406	4150	6552	9132	8705	9574	8584	8792	9344	10888

[a] Provisional data

Table 3. Biomass estimates (000' tons) from Greenland/Japanese surveys and SNG/DEU surveys for the years 1987-1991 in Subareas 0+1.

	SNG/DEU		Japan/GRL	
Year/Divisions	0B	1BCD	1ABCD	1BCD
1987	37	56	54[a]	54[a]
1988	55	47	63	53
1989	79	no survey	63	63
1990	72	88	56[b]	53[b]
1991	46	no survey	79	no survey

[a] In 1987 the survey did not cover the depth stratum 1000-1500 m.
[b] Average values of two surveys.

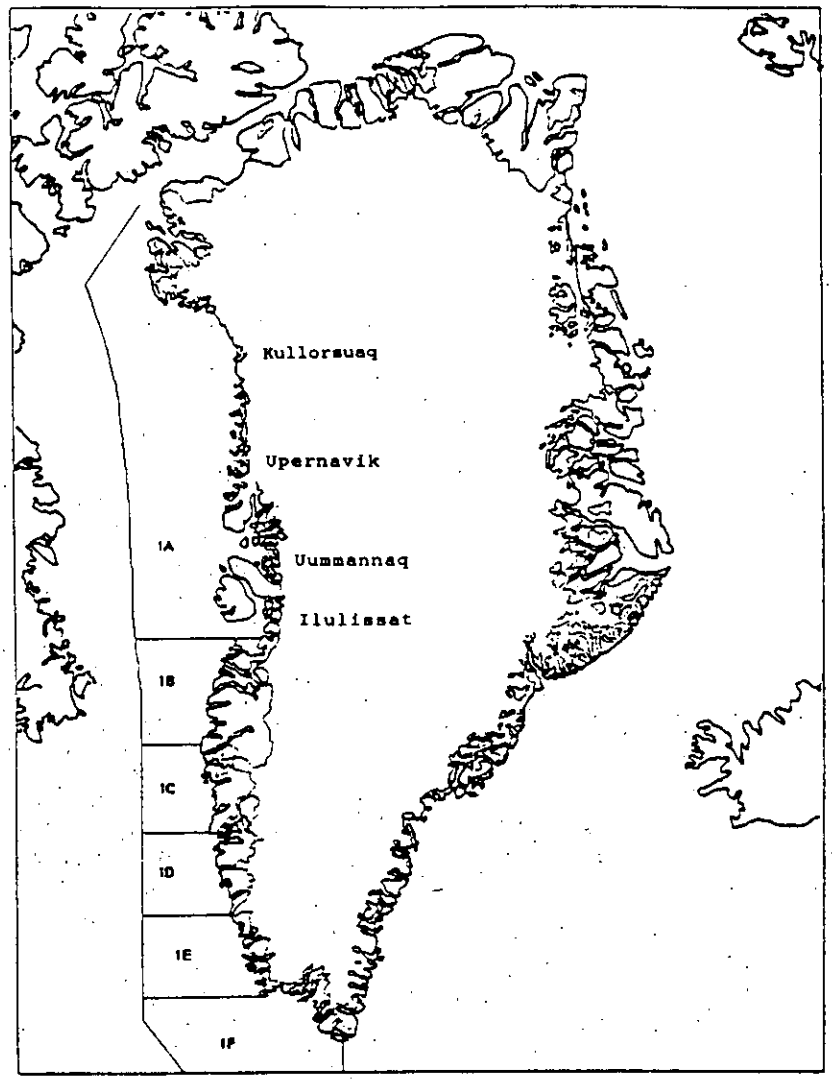

Fig.1. Map of Subarea 1 showing localities mentioned in the text.